

Claims

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1. A drive system for motor vehicles, in particular having
an internal combustion engine (13) as its main drive, a driving
clutch (15), a transmission (16) and at least one drive axle (17)
in the main drive train (10), furthermore having a secondary
5 drive train (11) and having secondary assemblies (19) which can
be disposed in the secondary drive train (11), the secondary
drive train (11) being capable of being coupled to the main drive
train, and having an electric machine operating as a starter
generator (20), characterized in that the secondary drive train
10 (11) has its own secondary assembly drive (22) which can be
coupled to the starter generator (20), and that the secondary
assembly drive (22) and the starter generator (20) can be coupled
to the driving axle (17) of the motor vehicle either individually
or jointly, with or without the main drive (13), to drive the
15 motor vehicle.

2. The drive system of claim 1, characterized in that the
main drive (13) or the secondary assembly drive (22) can be
decoupled from the respectively selected drive (13 or 20 or 22)
of the motor vehicle.

3. The drive system of claim 1, characterized in that the
main drive and the secondary assembly drive (22) are each an
internal combustion engine, and the power of the secondary
assembly drive (22) is less than half the power of the engine
(13) in the main drive train (10).

4. The drive system of claim 1, characterized in that for starting, the secondary assembly drive (22) is coupled to the starter generator (20) via a shift clutch (21).

5. The drive system of claim 4, characterized in that for starting, the main drive (13) can be coupled to the running secondary assembly drive (22).

6. The drive system of claim 1, characterized in that the secondary assembly drive (22) and the starter generator (20) are connected to the main drive train (10) via an intermediate gear (18).

7. The drive system of claim 6, characterized in that the intermediate gear (18) is connected on the inlet side to the starter generator (20) and on the outlet side can be decoupled both from the transmission (16) via the driving clutch (15) and from the main drive (13) in the main drive train (10) via an auxiliary clutch (14).

8. The drive system of claim 7, characterized in that in starting of the secondary assembly drive (22), the driving clutch (15) and the auxiliary clutch (14) in the main drive train (10) are opened.

9. The drive system of claim 8, characterized in that for direct starting of the secondary assembly drive (22), the driving clutch and the auxiliary clutch (15, 14) are opened, and the shift clutch (21) is closed.

10. The drive system of claim 8, characterized in that for impulse starting of the secondary assembly drive (22), the auxiliary clutch, driving clutch and shift clutch (14, 15, 21) are opened, and that the shift clutch (21) should be closed only after the starter generator (20) has run up to speed.

11. The drive system of claim 9, characterized in that by means of detection of the temperature of the secondary assembly drive (22), its starting operation can be switched over between direct starting and impulse starting as a function of temperature.

12. The drive system of claim 7, characterized in that for direct starting of the main drive (13) with the secondary assembly drive (22) running, the driving clutch (15) is opened, and the auxiliary clutch (14) and the shift clutch (21) are closed.

13. The drive system of claim 7, characterized in that for the impulse starting of the main drive (13) with the secondary assembly drive (22) running, the driving clutch (15) is opened, the shift clutch (21) is closed, and the auxiliary clutch (14) should be closed only after the intermediate gear (18) has run up to speed.

14. The drive system of claim 12, characterized in that by means of detection of the temperature of the main drive (13), its starting operation can be switched over between direct starting and impulse starting as a function of temperature.

15. The drive system of claim 14, characterized in that both in direct starting and in impulse starting of the main drive (13), the starter generator (20) in the motor mode is jointly activated.

16. The drive system of claim 7, characterized in that for starting the secondary assembly drive (22), the starter generator (20) and the shift clutch (21) can be triggered via a remote-controllable electric controller and supply means (12).

17. The drive system of claim 7, characterized in that for starting the secondary assembly drive (22), the starter generator (20) and the shift clutch (21) can be triggered when the driver door is opened via a door contact (26).

18. The drive system of claim 1, characterized in that when the travel power demand is very low and the battery charge is adequate, only the starter generator (20) is employed for driving the motor vehicle, by means of the electric controller and supply means (12).

19. The drive system of claim 1, characterized in that when the driving power demand is low, only the secondary assembly drive (22) is used for driving the motor vehicle.

20. The drive system of claim 1, characterized in that when the driving power demand is high, the secondary assembly drive (22) and main drive (13) are jointly used for driving the motor vehicle.

21. The drive system of claim 1, characterized in that when the driving power demand is briefly at maximum, both the secondary assembly drive (22) and main drive (13) as well as the starter generator (20) in the motor mode are used for driving the motor vehicle.

22. The drive system of claim 18, characterized in that the choice of operating mode of the motor vehicle drive, that is, the choice between the main drive (13) and/or the secondary assembly drive (22) and/or the starter generator (20), is made via an electric controller and supply means (12).

23. The drive system of claim 22, characterized in that the choice of operating mode is made as a function of the position of the gas pedal of the motor vehicle, which is detected via a gas pedal sensor (25).

24. The drive system of claim 1, characterized in that the secondary assemblies (19) are drivable either mechanically by the secondary drive train (11) or electrically.
